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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/911,036	07/23/2001	Joseph B. Kejha	JBK -10	3738

7590 12/12/2006  
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EXAMINER

WALKER, KEITH D

ART UNIT PAPER NUMBER

1745

DATE MAILED: 12/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/911,036

Applicant(s)

KEJHA ET AL.

Examiner

Keith Walker

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 24 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 5-8, 10-14, 21-23 and 28-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-8, 10-14, 21-23 and 28-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/24/06 has been entered.

Claims 5-8, 10-14, 21-23 & 28-31 are pending examination and are rejected for the reasons below.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,443,602 (Kejha) in view of US Patent 3,607,411 (Brownrigg).

Kejha discloses a method of coating a current collector grid with cathode material so that the grid is embedded in the middle of the coating (Fig. 4; 2:5-7, 4:31-60). As shown in Fig. 4, a web (11), which may be a "desired current collector," travels into a dip tank (37) and vertically upward through a solidification chamber (43) using nip rollers

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(3:50-55; 4:46-56; 6:4-5). The speed of all the components of the manufacturing process are synchronized and therefore controlled (7:59-61). While the nip rollers (109) used in Figure 1 are not disclosed as being driven nip rollers, other nip rollers in the process are disclosed as being driven nip rollers (8:11-17). It would be obvious to one skilled in the art to use driven nip rollers for the nip rollers (109) to move the coated layer along the process in a synchronized and controlled manner to improve the quality of the product. Kejha teaches that the current collectors described in US Patent Application serial number 08/281,011 may be used in the Patent 5,443,602 invention. (See US Patent 5,750,289, child of application 08/281,011, Col. 3, ll. 48-56). The metal grids, expanded metal foils, perforated metal foils, and solid metal foils recited in instant claims 28-31 are encompassed by the current collectors disclosed in US Patent application serial number 08/281,011. As disclosed by applicants, these current collectors include two or three layers of different materials including a plastic film or net layer, and one or two metal layers on the surface of the plastic. Thus, the current collectors disclosed in US Patent Application serial number 08/281,011 include a metal layer, which would be in the form of metal grid, expanded metal foil, perforated metal foil, or solid metal foil.

Kejha teaches a motor driven spool (5:14-20) but does not discuss the use of a slip clutch.

Brownrigg teaches an expanded metal grid used to make an electrode. The grid is pulled through a slurry of active material (dip-coated), therefore placing the grid in the middle of the electrode coating (Abstract; 5:1-12). A slip clutch is used to drive the nip

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rollers (3:35-52). The motivation to use the slip clutch is to insure uniform pulling force on the web, preventing a lag or break in the material, which would create a non-uniform electrode coating.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the driving motor of Kejha with the slip clutch of Brownrigg to provide a uniform driving force on the metal grid to insure an even coating of electrode material.

2. Claims 5-8, 10, 11, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,443,602 (Kejha) and US Patent 3,607,411 (Brownrigg) as applied to any of claims 28-31 above and further in view of US Patent 6,280,879 (Andersen).

The teachings of Kejha and Brownrigg as discussed above are incorporated herein.

Kejha also teaches attaching masking tape to the terminals of the current collector prior to further processing of the collector (3:45 – 4:30).

However, Kejha does not disclose application of a primer material to a current collector prior to dip-coating the current collector.

With regard to claims 5, 6, 10, 11-13 19, 21, and 22, Andersen teaches that current collector foils can be protected from highly reactive and corrosive electrode and electrolyte materials by coating the current collectors with primer. The primer is composed of carbon black, a binder (PVDF or PVDF copolymers), and solvent (multiple

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solvents used in Examples II and III). It was shown that the primer resulted in good adhesion (5:27-6:23; 14:14-16). One of ordinary skill in the art at the time the invention was made would have known. Thus, it would have been obvious to one of ordinary skill in the art to use the primer disclosed by Andersen et al. in the process disclosed in by Kejha in order to protect current collectors from reactive and corrosive materials and promote good adhesion.

With regard to claims 7, 8, 21, and 22, Andersen teaches an electrode paste having solvent in the range of 20-88% by weight, binder in the range of 1-10% by weight, active material in the range of 25-50% by weight, and carbon black as a conductive additive in the range of 2-10% by weight. PVDF is a preferred binder, and ketones, which include acetone, and N-methyl-pyrrolidone are preferred solvents. (Col. 7, ll. 17-65). Adjustment of the boiling point/evaporation rate of the solvent and the viscosity of the solvent are taught as critical, and thus it would have been obvious to one of ordinary skill in the art to use a combination of solvents to adjust vapor pressure, etc.

Regarding the order of the steps involved, Kejha teaches masking off an area of the collector to protect the surface from any subsequent coatings so a clean surface is provided for further attachment means. Anderson teaches providing a primer coating on the collector to promote good adhesion. It would have been obvious to one skilled in the art at the time of the invention to mask off the areas of the collectors needing a clean coating free surface, as taught by Kejha, before coating the collector with the primer coating as taught by Anderson.

3. Claims 14 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,443,602 (Kejha) and US Patent 3,607,411 (Brownrigg) and US Patent 6,280,879 (Andersen), as applied to claims 5 & 6 and further in view of Werner (U.S. Patent No. 3,694,392).

The teachings of Kejha, Brownrigg and Anderson as discussed above are incorporated herein. Kejha also teaches pulling the grid over a horizontal roller after a dip coating process and passing the grid through a solidifying chamber (Figs. 1 & 8; 6:47-53). The solidification chamber can be any of a well-known type, like a drying chamber with infrared heaters and fans (4:56-60).

However, the references are silent to the primer containing lithium polysilicate and carbon black.

Werner teaches a primer for increasing adhesion of a fluorocarbon polymer coating to a substrate. This primer contains lithium polysilicate, carbon black and water. (1:42-48; Example 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a primer containing lithium polysilicate, carbon black, and water as disclosed by Werner in the process disclosed by Kejha, Brownrigg and Andersen in order to increase adhesion of the dip-coated slurry to the current collector.

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4. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,443,602 (Kejha) and US Patent 3,607,411 (Brownrigg) as applied to claim 28, and further in view of U.S. Patent No. 5,385,761 (Iwanaga).

The teachings of Kejha and Brownrigg as discussed above are incorporated herein.

Neither Kejha nor Brownrigg discuss an electrode-cleaning step.

Iwanaga teaches sandblasting to remove the mask after the electrode has been coated (8:42-44). One of ordinary skill in the art would recognize that any abrading or polishing would remove the mask and any oxides that may have formed on the masked portion of the collector and would leave behind detritus. This detritus would adversely affect the joining of the current collector and terminal tab, thus requiring removal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include an electrode cleaning step to remove the mask as taught by Iwanaga in the process as disclosed by Kejha and Brownrigg in order to remove the mask and any oxides that may have formed so that good physical and electrical connections may be made.

### ***Response to Arguments***

Applicant's arguments with respect to all claims have been considered but are moot in view of the new ground(s) of rejection as discussed above.

Concerning claims 14 & 23, Kejha teaches pulling and drying the web horizontally over a roller as discussed above.



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Applicant argues the two references, Kejha and Brownrigg, should not be combined, however fails to give any reasoning for this statement.

Applicant argues the prior art does not teach controlling the speed of the web before the dip coating by using driven (metering) nip rollers. As discussed above, Kejha teaches using nip rollers at the dipping tank and it would be obvious to use the driven nip rollers discussed in the same reference for the same purpose, to drive the grid material and control the speed of the material as it is processed.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keith Walker whose telephone number is 571-272-3458. The examiner can normally be reached on Mon. - Fri. 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Trainer, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

K. Walker

MARK RUTH MOSKY  
PRIMARY EXAMINER

*Mark Ruth Mosky* 12.7.06